DIRECTIONS FOR A NATIONAL
AGRICULTURAL DEVELOPMENT STRATEGY
FOR CANADA

New Technology and Resource Development

A Saskatchewan Position Paper
Prepared for the First Ministers' Conference
on the Economy

November 28-29, 1985

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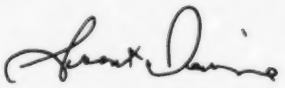
PREFACE

Today, Canadian agriculture is facing an economic environment which is fundamentally different than was the case in the past. The changes which have occurred call into question old approaches to national agricultural policy and point to the necessity for review and modification to meet today's needs.

This paper is one of four prepared as background to discussions on agriculture at the **First Ministers' Conference** in November 1985. The papers incorporate the views of many agricultural organizations presented as **briefs to the Government of Saskatchewan** and many of the issues raised at the **Saskatchewan Agriculture Conference** of October, 1985. They address the urgent requirement for a **national disaster program** and the need to review and modify policies, programs and regulations which affect **farm finance, trade and new technology and resource development.** These documents have been prepared to encourage public and farmer participation in discussions on the future of agriculture in Canada.

The Government of Saskatchewan is dedicated to the furtherance of agricultural prosperity. It is hoped that the ideas in these papers will contribute to a federal-provincial agreement on the need and the process to establish a new **National Agricultural Policy for Canada.**



Grant Devine
Premier of Saskatchewan

Regina, Saskatchewan
November, 1985

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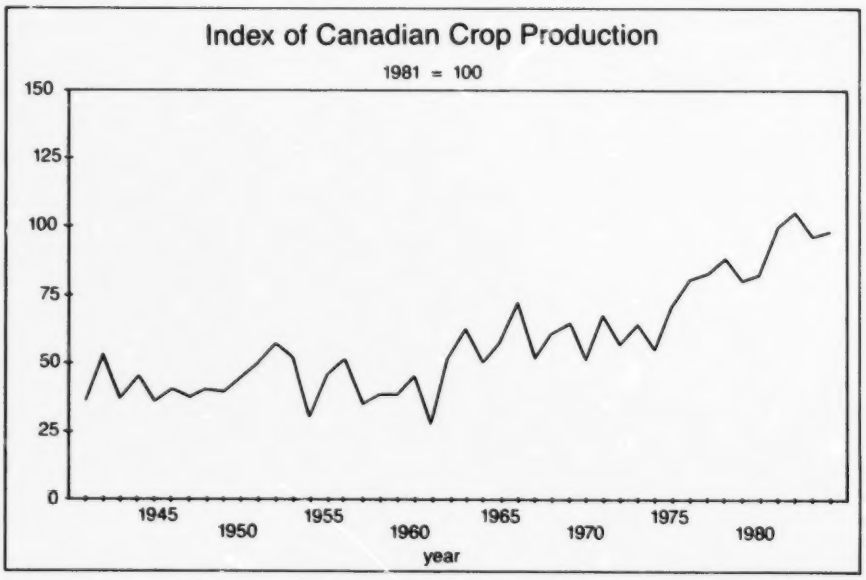
NEW TECHNOLOGY AND RESOURCE DEVELOPMENT

AGRICULTURAL DEVELOPMENT OVER THE YEARS

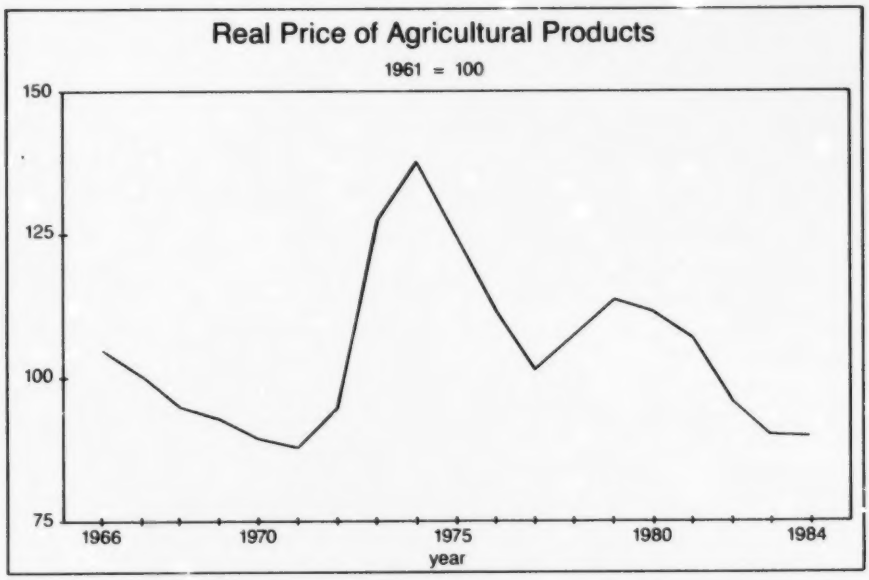
Throughout its history, the Canadian farm sector has been a leader in technological innovation, resource development, and improved management practices. Because of their determination and optimism, farmers have recognized the opportunities for building a strong agriculture industry.

> "The scientific community through research created the blueprints of modern agriculture and the farmers through their innovative talents (and sometimes trials and errors) made agriculture the industry it is today."
> (Dr. G. G. Khachatourians, Dept. of Applied Microbiology and Food Science, College of Agriculture, Saskatoon)

The growth and improvement in Canada's agricultural industry over the past has been remarkable. Farm management practices have responded to a rapidly changing environment. New technologies and improved farming methods have led to tremendous growth in the production of agricultural products. Mechanization of farm operations and the adoption of other technologies such as fertilizers and chemicals have significantly enhanced output. From 1941 to 1984 Canadian crop production increased almost threefold.



Historically, growth in the production of farm products worldwide has exceeded growth in market demand. This has resulted in a decline in the "real" price of farm commodities. After allowing for inflation, prices received for Canadian farm products have declined 14.4 percent from their 1966 level.



Today, international markets for agricultural products are becoming more competitive while producing nations are becoming more productive. Self-sufficiency drives by China, India and many other Third World countries, reduced population growth in developed countries, lack of purchasing power in countries with rapid population growth, and growing fears of protectionism imply heightened competition in the international market and a continuing decline in real commodity prices.

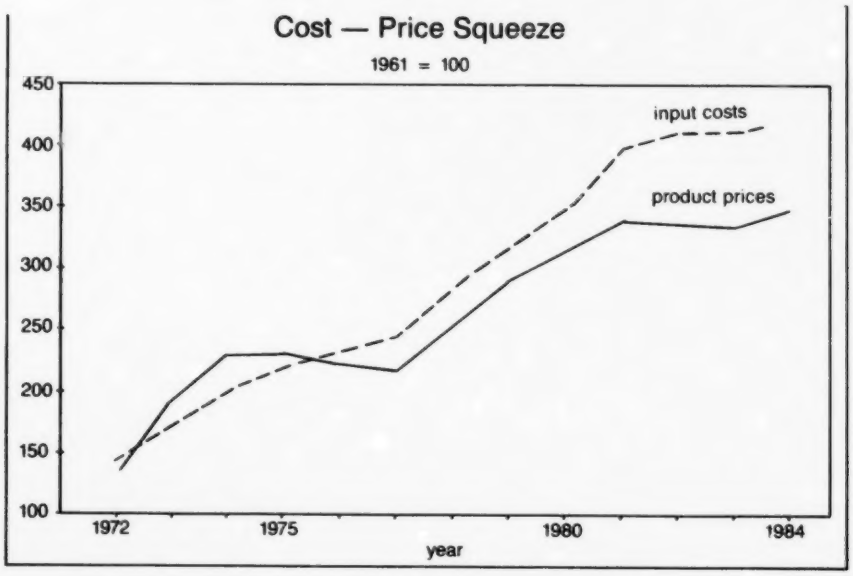
Comparative Wheat Yields
(tonnes/hectare)

	1961-65	1978-82	% Change
Canada	1.38	1.92	39.4
U.K.	4.05	5.68	40.2
France	2.93	5.01	71.0
India	0.84	1.56	85.7
China	0.88	1.95	121.6

Wheat Production
(1,000 tonnes)

	1961-65	1978-82	% Change
Canada	15,364	22,009	43.3
U.K.	3,520	8,211	133.3
France	12,495	22,492	80.0
India	11,191	34,562	208.0
China	22,230	56,919	156.0

While real prices for agricultural products have fallen, input costs have risen at a rate roughly equal to the general inflation rate. The result is a worsening cost-price squeeze.



Canadian farmers have survived the cost-price squeeze by being a part of the technological advance and improved farm management practices which have had such a profound impact on agricultural production worldwide. It is vital that the agriculture industry remains in the forefront of science and technology. A nationwide effort is required to quicken the pace of development and adoption of new technology so that farmers are able to cope with the cost-price squeeze through improved productivity and lower per unit costs of production.

NEW TECHNOLOGY

The Technological Revolution

> "As Canada heads towards the twenty-first century the value of research will be of no less importance to the continued development of our agricultural industry. Being primarily a trading nation dependent on the rest of the world to purchase much of our agricultural products, Canada must seek, through advances made by researchers, to maintain and improve upon its competitive position in world markets." (Saskatchewan Association of Rural Municipalities Brief)

Agricultural research has proven to be effective in promoting development of the Canadian farm sector. The returns to research are high; it is estimated there are over $14 in benefits generated to the Canadian economy for every one dollar invested in agricultural research. Development and adoption of new technology enhances agricultural productivity, lowers costs of production, improves the agricultural trade balance, and enhances the country's high technology research and development base.

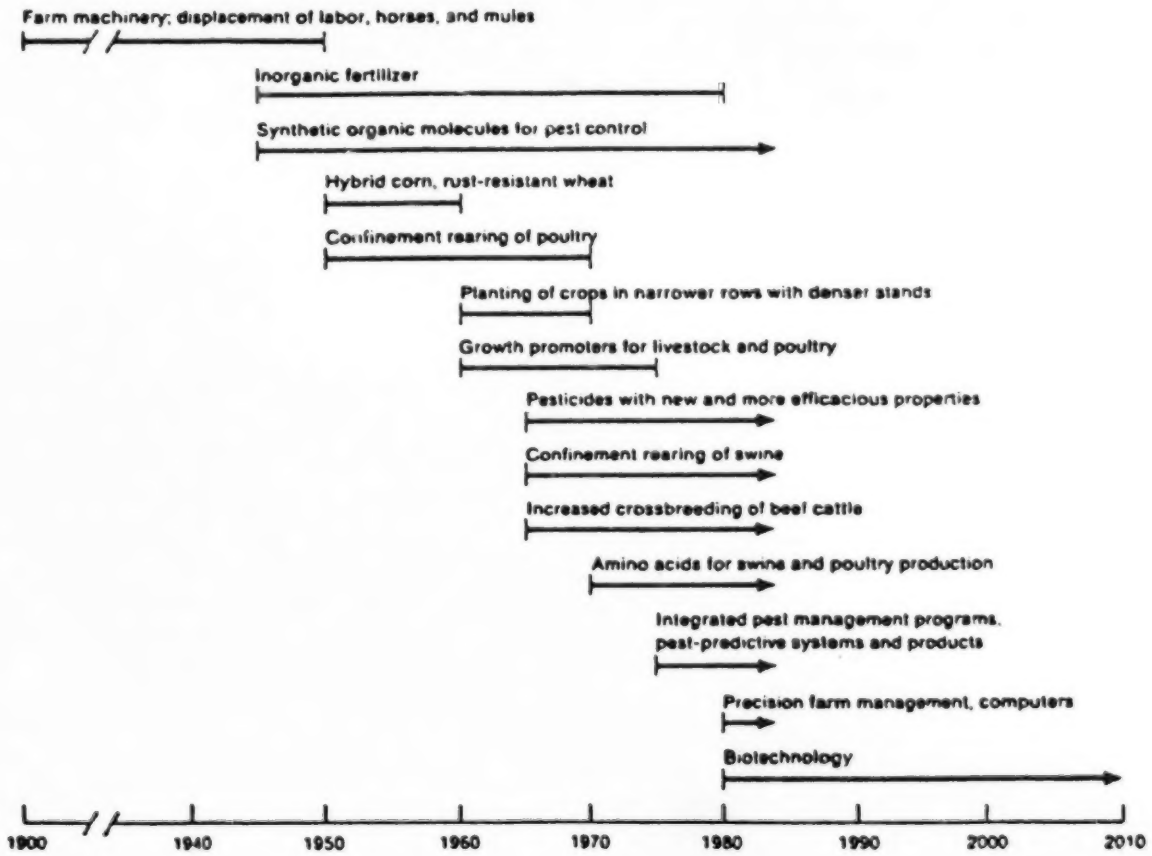
Canadian agricultural research and extension began with the Experimental Farm Stations Act of 1886. Dominion experimental farms were established to investigate the problems besetting agriculture in particular regions of Canada and to make the solutions available to farmers through the provincial governments, the farm press, and farmer gatherings. Researchers at these early stations directed their attention to finding appropriate livestock breeds and crop varieties for the harsh climatic conditions. Today, research stations, experimental farms, substations, and research institutes are found in every province.

New technology in agriculture has played an important role in the growth of the Canadian agriculture sector. Mechanization has dramatically lowered farm costs of production. Improvements in livestock breeding, feeding efficiency, disease control, and confinement livestock production have improved cost competitiveness and productivity. Improved crop varieties have generated tremendous benefits; for example, breeding for rust resistant wheat is estimated to have produced $482 in benefits for every one dollar invested. Between 1961 and 1975, $12 million were invested in rapeseed-canola research. The result is an industry

which produced $942 million in Canadian farm cash receipts in 1984. The development and adoption of fertilizer and chemicals have greatly increased agricultural productivity and enhanced the competitive position of Canadian grain producers.

Farm practices in agriculture are rapidly evolving, continuing the industry's sustained history of productivity improvement through the adoption of new technologies. Breakthroughs in biotechnology and biological engineering will play a greater role than the past successes of mechanization in transforming the shape of Canadian agriculture.

HISTORICAL SUMMARY OF TECHNOLOGICAL DEVELOPMENTS IN AGRICULTURE



The Science Council of Canada in Seeds of Renewal states "Biotechnology is the basis for a new revolution in agriculture. The new technology will reduce the time-lag formerly necessary for producing new plant varieties and improve plants in ways that were impossible with traditional methods". It is expected that within 10 years, 20 percent of all Canadian crops will have been developed through biotechnological processes. Biotechnology has the potential to reduce production costs and to breed crops able to resist salinity, drought and frost. Although biotechnology offers an opportunity for Canadian agriculture to maintain its competitive edge, little biotechnological research is underway in Canada. With favourable tax treatment, venture capital plays an important role in the development of biotechnology in the U.S.. While Saskatchewan provides a 30 percent provincial income tax credit to investors providing venture capital to small R&D firms, federal tax provisions in this area do not go far enough. Canadian venture capitalists require incentives to participate in strengthening R&D in areas such as biotechnology.

Innovations in computer technology and communications will accelerate the adoption of new technology and facilitate improvements in technical and financial management. Research will focus on increasing profitability, rather than increasing production, through opportunities such as the development and adoption of new varieties, fungicides and growth regulators, integrated pest management, improved breeding and disease control in livestock, increased use of on-farm computers, and development of alternative on-farm energy sources.

Facilitating Technological Change

Canada must actively promote the process of technological advancement rather than inhibit or even prevent the structural adjustment necessary for our agriculture industry. Attention to agricultural research and development is crucial to Canada's position as a world leader in high-tech research.

Our commitment to the funding of agricultural research and extension by itself is not enough. Governments must become more aware of their actions which hinder the longer term profitability of the farm sector. For example, licensing of new plant varieties which will result in net benefits for Canadian farmers should not be delayed.

Agriculture Canada research funding, adjusted for the general inflation rate (as measured by the Consumer Price Index), has remained relatively constant over the last few years. However, CPI may not provide a realistic indication of the increases in the costs of research. In a study prepared by the Department of Chemistry and Chemical Engineering at the University of Saskatchewan, the following rates of increases were documented for the period 1979-80 to 1980-81: the costs of organic chemical reagents rose 52 percent, glassware increased 23 percent, and organic chemicals rose 40 percent. Thus, the real level of research support from Agriculture Canada may well be declining if the rate of increase in the costs of doing research continues to exceed the general inflation rate.

A Renewed Commitment

It is important that the federal and provincial governments renew their commitment to funding the development of new technology as agricultural research is so fundamental to the development and competitive position of the farming sector. Saskatchewan has adopted a strategy to foster agricultural development by increasing provincial funding of research. By establishing the five-year, $200 million Agriculture Development Fund, we are focusing on the long term development of the agriculture industry. Saskatchewan is inviting private industry, farmers, universities and the federal government to participate in the Agriculture Development Fund. It is also important that producers and private industry increase their participation in agricultural research.

> "The high rates of return to research . . . also raise the question of the role of the agricultural industry itself as a source of funds for research. There is no doubt that agriculture has benefited greatly from research and this suggests that this industry should pay at least part of the research costs." (Strategy for Development of Rural Saskatchewan, Report of The Task Force on Rural Development May, 1985)

Promoting cost-competitiveness is a major element in Saskatchewan's strategy for encouraging agriculture development. A project to test the feasibility of compressed natural gas to replace costly farm fuels is underway. Another project aimed at input costs, the Saskatchewan Farm Input Price Survey, provides producers with timely price information to demonstrate the value of comparison shopping. Past surveys and studies have shown that publication of price information results in a decline in product price and a reduction of price differences among outlets.

Federal and provincial governments must review the goals and priorities of agricultural research in Canada so that we can maximize the returns to the dollars invested. Biological research in isolation of market information and engineering research in isolation of economics, will not be as effective as an integrated approach in

promoting the growth and development of the agriculture sector. Currently in Canada agricultural research is largely science-driven. Mission-oriented research, such as research to develop a product where a strong market has been identified, should receive greater attention. We must be cognizant of the economic and marketing environment facing agriculture as we set the objectives and priorities of the research programs in Canada. As well, research should be directed by regional production opportunities to allow us to fully exploit our comparative advantages.

As Canada moves forward in developing new technologies so will other developed nations in their efforts to remain cost-competitive. Canada will have increasing opportunities to import new technologies developed outside of the country. It will be important to increase our access to information on technologies appropriate for Canada's production opportunities.

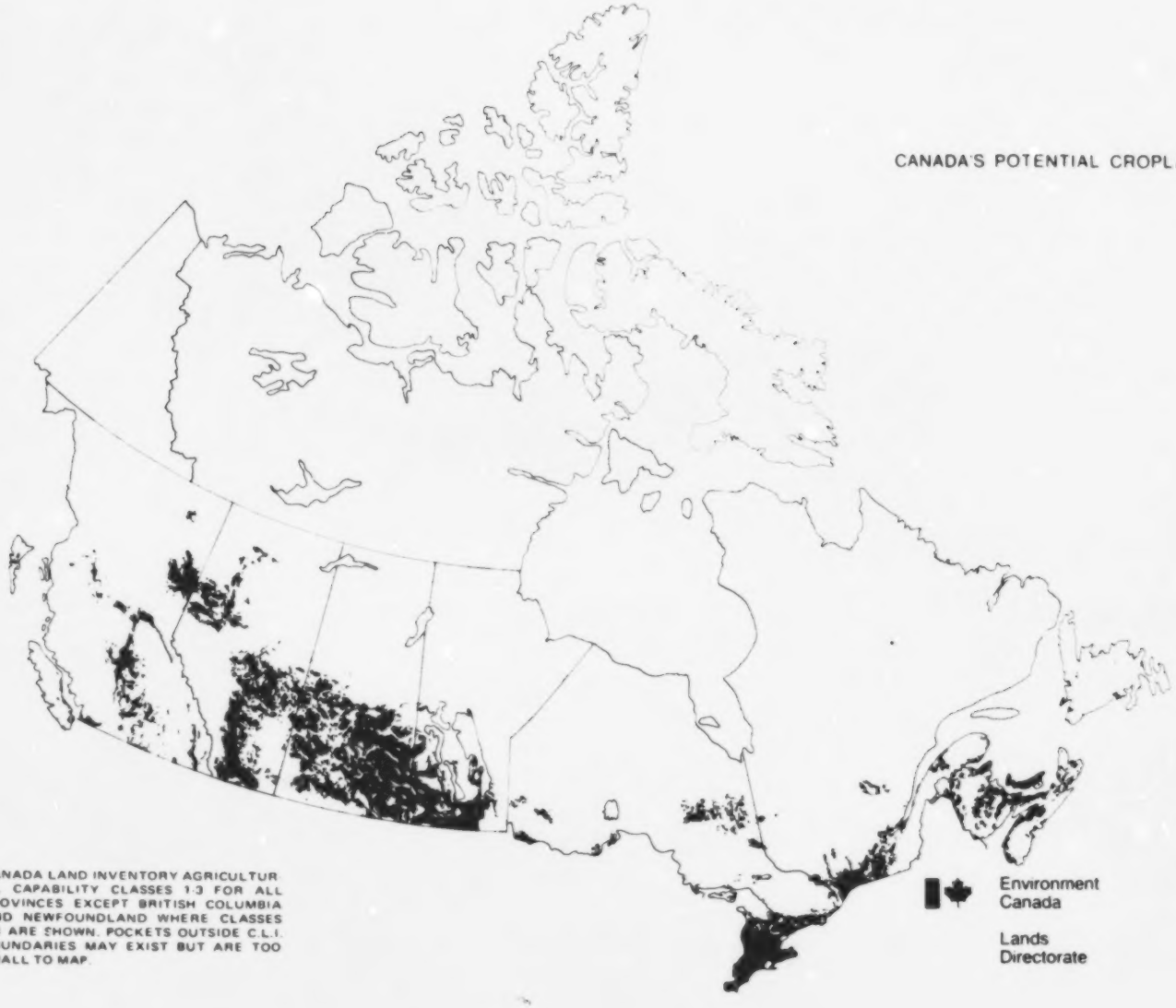
Agricultural research and adoption of new technologies by the farm community will be a vital part of the strategy to foster cost-competitiveness and productivity in the Canadian agriculture sector. A second and equally important aspect of the strategy is the effective management and development of our vast agricultural resource base.

RESOURCE DEVELOPMENT AND MANAGEMENT

Taking Our Resources For Granted

Canada's vast geographical area often gives us a misleading notion of the extent of our agricultural resource base. Less than 9 percent of Canada's land area is capable of being cropped and only 4.5 percent is actually cropped.

It is estimated that Canada lost 3.5 million acres of rich agricultural land between 1961 and 1976 (see Soil At Risk, A Report on Soil Conservation by the Standing Committee on Agriculture, Fisheries and Forestry, to the Senate of Canada; Hon. H. O. Sparrow, Chairman). Considering that there are only 110 million acres of farm land suitable for sustained production (Canada Land Inventory Class 1 to 3), this is a significant loss over a period of just 15 years.


CANADA'S POTENTIAL CROPLAND
* CANADA LAND INVENTORY AGRICULTURAL CAPABILITY CLASSES 1-3 FOR ALL PROVINCES EXCEPT BRITISH COLUMBIA AND NEWFOUNDLAND WHERE CLASSES 1-4 ARE SHOWN. POCKETS OUTSIDE C.L.I. BOUNDARIES MAY EXIST BUT ARE TOO SMALL TO MAP.
Environment Canada
Lands Directorate

Soil degradation, according to Soil at Risk, is costing our farmers more than $1 billion per year. PFRA calculates the cumulative benefits of soil conservation by the year 2000 will be more than $3 billion.

> "Preliminary field scale testing of a new water efficient, soil conserving cropping system suggests that provincial production increases in the vicinity of 60% to 100% are possible." (College of Agriculture, University of Saskatchewan Brief)

In 1935, the Prairie Farm Rehabilitation Act was passed as a federal emergency response to the disastrous drought conditions. Making use of the Dominion Experimental Farms, PFRA facilitated the construction of dugouts on 50,000 farms, it converted millions of acres of sub-marginal land into community pastures, and it promoted irrigation, tree planting, and reclamation. However, in 1948, PFRA's Cultural Division was transferred into the Experimental Farm Service, resulting in a lack of attention paid to research and extension of cultural solutions to soil degradation. PFRA's Soil and Water Conservation Service currently provides financial and technical support for soil conservation demonstration projects. However, long term funding has yet to be committed to this program. PFRA, provincial extension services, universities and other research institutions must work together on a long range soil conservation plan which bolsters research, extension and financial incentives. The strategy should emphasize cultural solutions such as extended crop rotations and minimum tillage while considering the economic and physical conditions of individual regions.

Land is not the only neglected resource. Water resources are of critical importance as drought and continuing water scarcity limit production on millions of acres. Flooding and sloughs often restrict production when it is economically feasible to construct drainage works.

Strengthening the production base through effective management of Canada's agricultural resources is a long term solution; it is an essential element of a National Agriculture Strategy.

A Window on the Opportunities

The long term viability of Canadian agriculture depends on our response to soil degradation. A National Soil Conservation Strategy must be developed to deal with wind and water erosion, soil salinization, and the dramatic decline in soil organic matter levels. These are challenges which must be met in order to maintain the ability of Canadian producers to compete in the marketplace.

Increasing the efficiency of moisture and fertilizer use has large potential benefits both in terms of immediate production and future production through soil conservation. Extended crop rotations, reduced tillage, snow trapping, and surface water management are some of the solutions. Special soil problems such as acidic,

solonetzic and northern soils also require attention because they limit production on several million acres.

In many areas of Canada, agricultural development will be facilitated through the protection of farmland from flooding and water erosion. As an example, there are about two million sloughs on Saskatchewan farmland which average one and one-quarter acres each. Over 60 percent of these dry up by the end of July and present limited value to wildlife. Effective drainage is in many cases economically feasible, especially where drainage and small scale irrigation projects can be combined.

Where drought and continuing water scarcity limit agricultural production, there is a need for careful management of water resources. Irrigation increases productivity, offers potential for crop diversification, mitigates the impacts of drought, and creates new opportunities for agricultural processing. With increasing demands (agricultural, industrial and residential) on our limited water resources, federal-provincial irrigation development agreements must be made in the context of a National Water Strategy. In addition to the opportunities in intensive irrigation, non-intensive schemes such as backflood irrigation can generate positive net benefits to hundreds of thousands of acres.

Hay and pasturelands in Canada provide further opportunity for land improvement. There is great potential to increase the grazing capacity of much of the public and private hay and pastureland in Canada.

Northern lands with agricultural potential could become an important component of the Canadian agriculture industry. As well as providing employment opportunities in the north, there is potential for further diversification into industries such as wild rice and game farming.

At the same time as we invest in the development of our agricultural resources, farmland is lost to urban and industrial pressures. About 87 percent of our best farmland is located within 100 miles of the centres of Canada's 23 largest cities. Effective land use policies will become more and more important to the agriculture sector as urban and industrial expansion follows the growth in the Canadian economy.

The Saskatchewan Government has recognized the importance of resource development by making a five-year commitment of funds under the Agriculture Development Fund to projects in water management, soil conservation, and land improvement. Canada's resource base offers great potential for agricultural development if conservation and development opportunities receive the attention they deserve.

BUILDING MOMENTUM FOR DEVELOPMENT

Canadian agriculture is facing a challenging and dynamic enviroment; markets are becoming increasingly competitive and costs of production are rising while real prices for farm products are falling. The farming industry cannot afford to stand still, especially when there is tremendous opportunity to improve agricultural productivity and cost-competitiveness. Agricultural research and adoption of new technologies, as well as the careful management and development of our soil and water resources will foster prosperity in the long run. Governments across the country must promote the structural adjustments needed to facilitate growth and development of the agriculture sector. Now is the time to adopt a national strategy to strengthen the competitive position of the Canadian farming industry.

SASKATCHEWAN RECOMMENDATIONS FOR ACTION ON NEW TECHNOLOGY AND RESOURCE DEVELOPMENT

1. Canada should establish a National Agricultural Research Council.

2. Federal and provincial governments, private industry and producers should commit funds for the creation of additional research chairs for each College of Agriculture.

3. Technological adoption must be promoted through the training of more agricultural scientists and the upgrading of farmers' education and skills.

4. Federal and provincial governments should establish Irrigation Development Agreements in the context of a National Water Strategy.

5. Non-intensive irrigation (backflood, combination drainage/backflood and slough consolidation/backflood) should be promoted.

6. Federal and provincial governments should negotiate a National Soil Conservation Strategy while the adoption of soil conservation technology and practices should be promoted through financial incentives.

7. All governments should encourage greater private sector and producer participation in agricultural research by demonstrating the profitability of such activity.